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16 April 1984

MEMORANDUM FOR THE RECORD

SUBJECT: Soviet Trade In Patents and Licenses

The following paper was written in response to a request from the DDO/LA to provide information on Soviet Trade In Patents and Licenses. The paper, itself, is Unclassified.



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Manpower and Planning Branch
Soviet Economy Division

Attachments

1. Patents Granted to the Soviet Union by Industrialized Western Countries
2. Active Soviet Licenses in the United States
3. Select License Agreements Between the Soviets and Western Firms

SOVA-M-84-10060

SUBJECT: Soviet Trade In Patents and Licenses

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11 April 1984

Soviet Trade in Patents and Licenses

A. Soviet Trade Policy With Regard to Licenses

Soviet technology trade has traditionally been concentrated on machinery imports and non-negotiable covert transfers, instead of licenses. Until the mid 1960's Soviet trade in licenses was virtually negligible. Since then license trade has assuredly grown, but the overall level is still probably low. One Soviet

[] has estimated the USSR spends less than 1 percent of its R&D budget on purchasing licenses--Western countries generally spend between 15 - 45 percent. []

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It is likely, however, that this estimate of Soviet spending refers only to the purchases of the Soviet foreign trade organization set up to trade licenses, Litsensintorg. These purchases are for "pure technology" licenses that do not include supporting hardware. Package deals that include licenses and hardware are not handled within Litsensintorg, and while numerous and important, are probably not included in the published Soviet estimates of license trade. If they were included the level of license trade may be significantly increased, but would still constitute a very small share of total Soviet trade and, additionally, would still be much less than the level of license trade carried on by Western countries. []

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The most interesting comparison is with Japan. Like the Soviet Union, Japan entered the post-war period with a wrecked economy and a determination to rebuild quickly. The Japanese, while not allowing direct foreign investment, did actively pursue Western technology and know-how and between the years 1965 and 1971, for instance, purchased 6851 licenses. The USSR, on the other hand, showed little interest in licenses until the mid 1960's and, [REDACTED] by 1976 had acquired only 1,300 licenses. [REDACTED]

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Interest in license trade has probably increased since the mid 1970's as Soviet disappointment in the benefits of plant and equipment imported without accompanying know-how has grown. However, the post-Afghanistan East-West political environment and hard currency constraints have probably discouraged Soviet imports of licenses, despite the technological advances the USSR believes such licenses could promote. It is also likely that Soviet exports of licenses--which are probably no more than one-half Soviet imports of licenses with respect to both the number and value of transactions--have not significantly grown. They have been hindered not only by the political climate but by Soviet bureaucratic obstacles which include a general unwillingness to release with the license all needed auxiliary information. [REDACTED]

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B. Some Facts and Figures on Soviet Trade and Licenses

There is little information on Soviet trade in patents and licenses, but, according to the available evidence;

-- Industrialized Western countries have granted the USSR at least 17,000 patents since the mid-1970s (Attachment 1).

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-- The Soviets sell licenses to more than 30 countries.

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-- Inter-CEMA license deals are probably relatively few.

According to Soviet sources, in the mid 1970's there were only around 100 such arrangements in effect.

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-- In 1976, the last year for which data are available, Soviet license sales totaled 119 on a world-wide basis.

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-- The number of Soviet licenses sold to the West totaled around 200 for the years 1962-1976. One study gives a rough estimate of Soviet earnings from sales of licenses to the West from 1964 to 1976 of \$100-107 million and contrasts this with U.S. license earnings in Western Europe in a single year (1977) of \$2,263 million.

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-- The number of licenses the Soviets sold to the U.S. over the last 15 years is quite small--around 30. The value of these sales, measured in fees and royalties paid, is probably not more than \$50 million.

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-- Soviet imports of licenses are at least 2-3 times greater (in both value and number) than Soviet license exports.

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-- Data collected by John Kiser in 1979 implies that about 50 percent of Soviet exports of licenses to the West are in the field of metallurgy. (Attachment 2 is a list of Soviet licenses in the United States compiled last year

by John Kiser. Attachment 3 is a list of select license agreements between the Soviets and Western firms published in a 1980 OECD study.)

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C. Effect of Imported Licenses on the Soviet Economy

It is difficult to estimate the impact of importing licenses on the Soviet economy as a whole. Licenses probably have played an important role in the development of specific industrial sectors such as automobiles and chemicals. On the whole, however, the effect of licenses has probably been slight and has definitely been far below potential because of the Soviet policy of severely limiting the personal contacts and exchanges necessary to effectively transfer the know-how embodied in a license. The lack of such personal interaction, coupled with the well know problems the Soviets have in coordinating research, development and production within their civilian economy presents a formidable obstacle to the effective utilization of imported licenses on a broad scale--although high priority licenses are apt to receive enough special resources to serve as exceptions to this general rule.

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D. Evaluation of Soviet Capability to Transfer Licenses and Patents to Different Sectors of the Economy

The Central Research Institute for Patent Information (TsNIPI) acts as a clearing house to collect and disseminate information on Western patents throughout the economy. Its collection and transfer of information on patents to different sectors seems well organized, substantially funded and effective. Efforts to effectively utilize patent information,

however, often fall victim to the influences already cited in section C of this paper--xenophobia and problems in the R&D and production process. These same factors inhibit effective utilization of Western licenses. Even if a single sector surmounts these obstacles, further successful transfer of the technology embodied in a patent on license is likely to be a slow process because of bureaucratic separation and competition between branches.

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Attachment 1

Patents Granted to the Soviet Union (1970-82)
by Industrialized Western Countries*

| Applicant Country-(<u>Soviet Union</u>) by year | | | | | | | | | |
|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <u>Grant Country</u> | <u>1970</u> | <u>1975</u> | <u>1976</u> | <u>1977</u> | <u>1978</u> | <u>1979</u> | <u>1980</u> | <u>1981</u> | <u>1982</u> |
| Austria | 71 | 68 | 57 | 60 | 44 | 54 | 54 | 35 | 41 |
| Belgium | 125 | 42 | 31 | 29 | 13 | 19 | 11 | 9 | 11 |
| Canada | 112 | 101 | 120 | 133 | 136 | 105 | 138 | 146 | 147 |
| Denmark | 8 | 15 | 10 | 15 | 16 | 11 | 11 | 12 | 11 |
| France | 326 | 198 | 705 | 542 | 414 | 333 | 553 | 349 | 256 |
| FRG | 80 | 351 | 391 | 383 | 373 | 353 | 313 | 239 | 277 |
| Italy | -- | -- | -- | -- | -- | -- | 39 | -- | -- |
| Japan | 78 | 209 | 193 | 337 | 259 | 242 | 225 | 233 | 203 |
| Luxembourg | 2 | 3 | 2 | 2 | 2 | 3 | -- | 1 | 2 |
| Netherlands | -- | 23 | 35 | 36 | 40 | 42 | 48 | 32 | 25 |
| Norway | 11 | 15 | 13 | 13 | 10 | 14 | 7 | 11 | 14 |
| Sweden | 150 | 171 | 153 | 126 | 124 | 94 | 93 | 85 | 122 |
| Switzerland | 93 | 101 | 76 | 133 | 8 | 61 | 51 | 71 | 62 |
| Britain | 369 | 458 | 430 | 353 | 413 | 250 | 172 | 110 | 191 |
| U.S. | 218 | 404 | 426 | 393 | 411 | 329 | 463 | 373 | 209 |
| Total | 1,643 | 2,159 | 2,642 | 2,555 | 2,263 | 1,910 | 2,178 | 1,706 | 1,571 |

* U.S. Department of Commerce.

Active Soviet Licenses in the United States*

| <u>Technology</u> | <u>Sold To</u> | <u>Date Approx.</u> |
|--|---|-------------------------|
| Surgical Stapling Instruments | U.S. Surgical Corp. 3M | 1964 1979 |
| Hydraulic Rock Crusher | Joy Manufacturing | 1969 |
| Pneumatic Underground Punch "Hole Hog" | Allied Steel & Tractor | 1971 |
| Evaporative Stave Cooling of Blast Furnaces | Andco Engineering | 1972 |
| Aluminum Silicon Alloy | Ethyl Corporation | 1973 |
| Production of Hollow Ingots by Electroslag Remelting | Cabot | 1973 |
| Flux Cored Electrodes | Chemetron | 1974 |
| Magnetic Impact Bonding | Maxwell Laboratories | 1974 |
| Drug Pyrroxan for Treating Central Nervous System Disorders | American Home Products | 1974 |
| Ethnozin for Treating Cardiac Arrest | Dupont | 1974 |
| Electromagnetic Casting of Aluminum | Kaiser Aluminum Reynolds Aluminum Alcoa | 1975 |
| Carboxide Insect Repellant | American Home Products | 1975 |
| In Situ Underground Coal Gasification | Texas Utilities Services, Inc. | 1975 |
| Carminomycin and Ftorafur Anti-Cancer Agents | Bristol Myers | 1976 |
| Bulat Process for Titanium Nitriding | Multiarc Vacuum Systems | 1979 |
| Flash Butt Welding of Large Diameter Pipes | J. R. McDermott | 1980 |
| Electromagnetic Casting of Copper Alloys | Olin Brass | 1980 |
| Cone Crusher | Rexnord | 1981 |
| Air Column Separator | Air Products | 1981 |
| Medical Preparation Riocidin | Ciba Geigy USA | 1982 |
| Biodegradable Polymer Pin for Orthopedics | Medco | 1982 |

**Details of licenses sold through 1976 can be obtained in J.W. Kiser's Report on the Potential for Technology Transfer from the Soviet Union to the United States, prepared for the U.S. Department of State, Office of External Research, 1977. Copies can be obtained through Kiser Research, Inc.*

ATTACHMENT 3: Select LICENSE AGREEMENTS BETWEEN
THE SOVIETS AND WESTERN FIRMS

Table A-29 (cont'd)

Firms to CMEA Countries

| Western Licensor ^a | |
|-----------------------------------|------|
| Remap (Fr) | |
| Sace (I) | |
| Mechanite (UK) | |
| Sulzer (Swi) | |
| Rubery Owen (UK) | |
| British Rubber (UK) | |
| Integral (A) | |
| Lucas (UK) | |
| Teijin (Ja) | |
| Toyo Engineering (Ja) | |
| Union Carbide (US) | |
| Vereinigte Kesselwerke (FRG) | |
| Alsthom (Fr) | |
| Friedrich Kochs (FRG) | |
| Merloni (I) | |
| Bosch (FRG) | |
| Brown, Boveri (Swi) | |
| Girling (UK) | |
| Hampden Industries (US) | |
| Rocla Industries (Aul) | |
| San Giorgio (I) | |
| Semperit (A) | 1976 |
| Franz von Furtenbach (A) | 1977 |
| Chaffoteaux et Maury (Fr) | 1976 |
| MAN (FRG) | 1975 |
| Standard-Elektrik Lorenz AG (FRG) | 1975 |
| AEG (FRG) | 1977 |
| Kömmerring (FRG) | 1977 |
| Terosen (FRG) | 1977 |
| AGA Svetsprodukter (Swe) | 1976 |
| Vauxhall Motors (UK) | 1975 |
| Dent, Hellyer (UK) | 1976 |
| Steiger (US) | 1974 |
| Berliet (Fr) | |
| Bopp and Reuther (FRG) | |
| British Petroleum (UK) | |
| Hitachi (Ja) | |
| Gillette (US) | |
| Marubeni-Ida (Ja) | |
| Toray Industries (Ja) | |
| Alsa Schuhbedarf (FRG) | 1976 |
| Steyer-Daimler-Puch (A) | 1975 |

| Buying CMEA Country | Description of the Technology | Western Licensor ^a | |
|---|--|----------------------------------|------|
| Poland (cont'd) | Licence for making gear-boxes for rotary plugs | Huard (Fr) | 1977 |
| | Licences for prod. of concrete mixers and containers | Stetter (FRG) | 1977 |
| | Licences to produce relays for railway signal boxes | (Swe) | 1975 |
| | Licences, know-how for making electric typewriters | (Swe) | 1976 |
| | Licence for making construction equipment | Clark Equipment (US) | 1972 |
| | Licences for making tractors and accessories | International Harvester (US) | 1974 |
| | Licences, equipment for making semi-conductors, rectifiers | Westinghouse (US) | 1974 |
| | Licences, machines for making medical equipment | General Electric (US) | 1976 |
| Rumania | Semi-conductors | Compagnie générale de TSF (Fr) | |
| | Transformers for TV sets | Philips (N) | |
| USSR (not distributed by industrial branches) | Porous acetylene bottles | L'Air Liquide (Fr) | |
| | Axis-blower for nuclear power stations | A.G. Kühnle, Kopp & Kausch (FRG) | |
| | Chemical treatment of steel strips | Anchem Products (UK) | |
| | Furnaces for sulphur burning | Chemibau Zieren (FRG) | |
| | Numerically controlled machine-tools | Fujitsu (Ja) | |
| | Modular switches | Isostat (Fr) | |
| | Motor vehicle brakes | Knorr-Bremse (FRG) | |
| | Machine-tool heads | Line (Fr) | |
| | Resistors and equipment for their manufacture | Précis (Fr) | |
| | Coating of metal sheets for motor vehicles | Pro Finish Metals (US) | |
| | Prefabricated houses | Tchersmachiner (Swe) | |
| | Electro-hydraulic cranes | Xegglood and Sioner (Swe) | |

(Cont'd on next page)

Table A-29 (cont'd)

| Buying CMEA Country | Description of the Technology | Western Licensor ^a | | Buying CMEA Country | |
|---|---|--|------------------|------------------------|---|
| USSR (distributed by industrial sectors) | | | <i>Announced</i> | USSR (cont'd) | |
| | Automotive | | | | Automatic lin Thermistors p |
| | Togliattigrad automotive plant - Positork automatic ignition device | DBA (Fr) | 1/76 | | Marlboro cigs |
| | Business Equipment | | | | Photograph c Electric stove |
| | Electric typewriters | Olympia Werke (FRG) (announced July 1974) | | | |
| | Chemicals and Petrochemicals | | | | Conversion o rolled steel Direct reduct to be used Steel structur manufactur |
| | Aromatics | Arco Chemical (US) | 11/72 | | |
| | Chloropropene monomer on butadiene base | BP Chemicals International (UK) | 3/73 | | |
| | Reinforced plastic foil | Ewald Dörken (FRG) | 8/73 | | |
| | Alpha calcium-sulphate semihydrate refining | Gebr. Giulini (FRG) | 9/74 | | |
| | High solid latex | International Synthetic Rubber (UK) | 3/73 | | |
| | Acetic acid | Lummus Co. and Monsanto | 12/73 | | |
| | Automatic zinc-removing devices used in electrolysis | Montedison (I) | 12/72 | | Wedge press related tra Abrasive ma Universal pr |
| | Isocyanate processing | Upjohn Co. (US) | 10/72 | | |
| | 200 cm. reactor for production of suspension PVC | Chemische Werke Huels AG (FRG) | 4/75 | | |
| | "Pattex" contact glue | Henkel & Co. (FRG) | 5/75 | | |
| | Polymerization agent Liladox, a percarbonic acid derivative | Kemanord (Swe) | 7/75 | | Containers |
| | "Betanal", a herbicide for turnip and beet fields | Schering AG (FRG) | 5/75 | | |
| | Porous material for acetylene bottles | L'Air liquide (Fr) | 7/76 | | |
| | Synthesized standard gases | Seitetsu Kagaku Kogyo (Ja) | 3/77 | | Disposable p |
| | Construction | | | | Aluminium |
| | Roadbuilding and paving equipment | CMI Corp. (US) | 10/76 | | |
| | Consumer Goods | | | | Aluminium manufactu |
| | Stainless steel razors | Wilkinson Sword (UK) | 8/73 | | |
| | Padlocks and mortise locks | Wärtsilä (Fin) | 8/76 | | |
| | Photoflash cubes | Bellmann (FRG) | 11/76 | | Nylon film 1 |
| | Electrical Equipment | | | | Ethyl-benze Gas desicc Orenburg Oil drilling |
| | Air preheaters for power stations | Kraftanlagen Heidelberg (FRG) | 2/73 | | |
| | Axial bellows for power static cauldrons | Kühnle, Kopp & Kausch (FRG) | 8/72 | | |
| | Cassette magnet head | Wolfgang Bogen (FRG) | 5/74 | | |
| | High-voltage powerline insulation materials | General Cable (US) | 2/77 | | |

cont'd)

Western Licensor^a

Announced

DBA (Fr) 1/76

Olympia Werke (FRG)
(announced July 1974)

chemicals

Arco Chemical (US) 11/72
BP Chemicals International (UK) 3/73
Ewald Dörken (FRG) 8/73
Gebr. Giulini (FRG) 9/74International Synthetic Rubber (UK) 3/73
Lummus Co. and Monsanto 12/73
Montedison (I) 12/72Upjohn Co. (US) 10/72
Chemische Werke
Huels AG (FRG) 4/75
Henkel & Co. (FRG) 5/75
Kemanord (Swe) 7/75

Schering AG (FRG) 5/75

L'Air liquide (Fr) 7/76

Seitetsu Kagaku Kogyo (Ja) 3/77

CMI Corp. (US) 10/76

Wilkinson Sword (UK) 8/73
Wärtsilä (Fin) 8/76
Bellmann (FRG) 11/76

Kraftanlagen Heidelberg (FRG) 2/73

Kühnle, Kopp & Kausch (FRG) 8/72
Wolfgang Bogen (FRG) 5/74
General Cable (US) 2/77

Table A-29 (cont'd)

Buying CMEA
CountryDescription of the
TechnologyWestern Licensor^a

USSR (cont'd)

Announced

Electronics

Automatic line for reed relays Wm. Günther (FRG) 7/77
Thermistors plant Murata Manufacturing (Ja) 8/77

Food Products and Tobacco

Marlboro cigarettes Philip Morris (US) 2/77

Household Equipment

Phonograph cabinets Berlin Consult (FRG) 1/74
Electric stoves Merloni SpA (I) 9/73

Iron and Steel

Conversion coating of cold Amchem Products (UK) 9/72
rolled steel strips
Direct reduction process Midrex Corp. (US) 4/75
to be used in Kursk furnace
Steel structure Blohm & Voss (FRG) 1/77
manufacturing plant

Machine-Tools

Wedge presses and Eumuco (FRG) 12/73
related transport equipment
Abrasive material Norton (US) 1/73
Universal presses Aida Engineering (Ja) 7/74

Materials-Handling Equipment

Containers Renault Industries Equipements
et Techniques (Fr) 12/73

Medical Equipment

Disposable plastic medical goods Portex (UK) 8/77

Metalworking

Aluminium wire W. C. Heraeus (FRG) 8/77

Mining and Metallurgy

Aluminium casting; Pechiney Ugine Kuhlmann 11/76
manufacture of equipment (Fr)

Packaging

Nylon film production plant Kohjin (Ja) 6/76

Petroleum and Gas

Ethyl-benzene Universal Oil Products 1/74
Gas desiccation Davy Power Gas (FRG) 3/76
Orenburg natural gas complex
Oil drilling platform Aramco International (US) 7/76

(Cont'd on next page)

Table A-29 (cont'd)

| Buying COMECON Country | Description of the Technology | Western Licensor ^a | Announced |
|---------------------------|--|--|-----------|
| USSR (cont'd) | | | |
| | Offshore exploitation of gas and oil, including blowout preventers, preventer control devices, Sea King and Marine Riser systems | Seitetsu Kagaku (Ja) | 5/77 |
| | Printing | | |
| | Two-web offset presses | Maschinenfabrik Augsburg-Nürnberg (FRG) | 9/74 |
| | Pulp and Paper | | |
| | Know-how and equipment for production of "Super Perga" paper | Greiner Industrier (No) | 5/75 |
| | Rubber | | |
| | Butadiene-type poly-chloroprene rubber | DuPont de Nemours (US) | 8/74 |
| | Shipping and Shipbuilding | | |
| | Pipe-sealing technology | Chuetsu-Waukesha (Ja) | 6/77 |
| | Textiles, Clothing and Leather | | |
| | Yield-increasing raw wool scouring | Sover SA (Be) | 1/74 |
| | Clothing factory | McIntosh Confectie (N) | 1/77 |
| | Corset tulle | Gold-Zack Werke (FRG) | 8/77 |

^a Country abbreviations: A: Austria, Aus: Australia, Be: Belgium, Fin: Finland, Fr: France, FRG: Federal Republic of Germany, I: Italy, Ja: Japan, N: Netherlands, No: Norway, Swe: Sweden, Swi: Switzerland, UK: United Kingdom, US: United States.

Sources:
— "Doing Business with Eastern Europe", *Business International*, October 1975.
— J. Wilczynski, *Technology in Comecon*, MacMillan, London and Basingstoke, 1974, p. 303.
— J. Wilczynski, "Licences in the West-East-West Transfer of Technology", *Journal of World Trade Law*, March-April, 1977, p. 133.
— Office of East-West Policy and Planning, Bureau of East-West Trade, US Department of Commerce, 8th June, 1977.

Note of Bureau of East-West Trade: Although information on these transactions has been taken from published sources, the Bureau cannot vouch for its accuracy.

Examples

| The Selling Comecon Country | |
|--------------------------------|---|
| German Democratic Republic | Steel bar |
| Bulgaria | Automat spinnin Electroly Perfecte yoghur Protectio steel p |
| Czechoslovakia | Automat Spindlek Producti Soft con Skin pre Spindlek Vertical |
| Hungary | Manufa conde Manufa batter Method Rust pr Protein Substitu |
| Poland | Manufa house Method Forging Carous Autom |
| USSR | Autom Casting |
| | Constr Improv |
| | Manuf mete Manuf gaug Manuf mac Produc tube |
| | Synth Needle Steel s Anti-c Coolin Thin- |

(cont'd)

| Western Licensor ^a | | |
|-------------------------------|--|-----------|
| | | Announced |
| oil, | Seitetsu Kagaku (Ja) | 5/77 |
| | | |
| | Maschinenfabrik Augsburg-Nürnberg (FRG) | 9/74 |
| aper | Greaker Industrier (No) | 5/75 |
| | | |
| | DuPont de Nemours (US) | 8/74 |
| building | Chuctsu-Waukesha (Ja) | 6/77 |
| and Leather | Sover SA (Be) | 1/74 |
| | McIntosh Confectie (N) | 1/77 |
| | Gold-Zack Werke (FRG) | 8/77 |

a: Finland, Fr: France, FRG: Federal Republic of Germany, Gerland, UK: United Kingdom, US: United States.

sober 1975.
teasingtoke, 1974, p. 303.
ology", *Journal of World Trade Law*, March-April, 1977,

le, US Department of Commerce, 8th June, 1977.

sections has been taken from published sources, the Bureau

Table A-30
Examples of Licences sold by the COMECON Countries
to Western Firms

| The Selling Comecon Country | Description of the Technology | Western License Firm ^a |
|-----------------------------|---|---|
| German Democratic Republic | Steel bar faggoting machines | Ataka and Co. (Ja) |
| Bulgaria | Automatic reeling and placing of spinning spools Electrolytic refining of copper Perfected process for producing yoghurt Protection of graphite electrodes in steel production | Carrelli Industriali Tessili (I) Inspiration Consolidated Co. (US) Miliforma (FRG) British Steel Corp. (UK) |
| Czechoslovakia | Automatic textile-winding machines Spindleless spinning machines Production of electric ovens Soft contact lenses Skin protection varnish Spindleless spinning machines Vertical forging presses | Ensju (Ja) Daiwa Spinning (Ja) Horn (FRG) Bausch and Lomb (US) Albus (Sp) Nuova San Giorgio (I) Kurimoto (Ja) |
| Hungary | Manufacture of equipment for condensing air Manufacture of small rechargeable battery cells Method of water purification Rust prevention process Proteins from grasses Substitute body tissues | Mitsubishi Heavy Industries (Ja) William Old (UK) Ebara Infilco (Ja) Tecomex (Sp) Alfa-Laval (Swe) MGA Technology (US) |
| Poland | Manufacture of extract of the smoking-house smoke Method of forging crankshafts Forging of crankshafts Carousel furnaces Automatic safety winches | Hercules Powder (US) Sulzer (Swi) Endo Ironworks (Ja) Creusot-Loire (Fr) Dusterloch (FRG) |
| USSR | Automatic loading of pulpwood Casting of aluminium ingots Construction of blast furnaces Improved methods of steel making Manufacture of a new type of metalcutting machine Manufacturing of a pulsed waterflow gauge used in mining Manufacture of specialised mining machines Production of double-walled plastic tubes by extrusion Synthetic acids from paraffin Needle-cutting technique Steel and alloys Anti-cancer drug Cooling of blast furnaces Thin-walled tubing | J. M. Voith (A) Kaiser Aluminium Chemical Corp. (US) Andco (Can) Ashmore, Benson, Pease & Co. (UK) Demag (FRG) Joy Manufacturing Co. (US) Sociedad Metallurgica Duro Felguera (Sp) Anger Plastik Verarbeitungsmaschinen Gesellschaft (A) Adzina Moto (Ja) Amtel (US) Avesta (Swe) Bristol-Myers (US) Broken Hill (Aul) Carpenter Technology (US) |

(Cont'd on next page)

Table 30 (cont'd)

| The Selling Comecon Country | Description of the Technology | Western License Firm ^a |
|-----------------------------|--|--|
| USSR (cont'd) | Continuous welding electrodes Particle accelerators Tube cold rolling mills Polycarbonates Gas-permeating membrane High pressure polyethylene Rotary printing machines Aluminium from alunite Pneumatic transporter system Chemical disposal of waste Surgical instruments | Chemetron (US) Energy Science (US) Innocenti (US) Montedison (I) Rhône-Poulenc (Fr) Salzgitter (FRG) Schnellpressen Fabrik (FRG) Southwire (US) Sumitomo (Ja) Toyo Engineering (Ja) US Surgical (US) |

^a Country abbreviations: A: Austria, Aul: Australia, Can: Canada, Fr: France, FRG: Federal Republic of Germany, I: Italy, Ja: Japan, Sp: Spain, Swe: Sweden, Swi: Switzerland, UK: United Kingdom, US: United States.

Source: J. Wilczynski, *Technology in Comecon*, op. cit., p. 309; and J. Wilczynski, "Licenses in the West-East-West Transfer of Technology", *op. cit.*, p. 133.

Table A-31
Recent Co-operation Agreements with the USSR

| Western Partner | Soviet Partner | Purpose of Agreement | Announced |
|------------------------------|-------------------------|---|-----------|
| Agriculture | | | |
| Gi è Gi SAS (Italy) | Tractoresport | Production and marketing cattle-feeding complexes. | 1/74 |
| Elanco (US) | Ministry of Agriculture | Joint tests of antibiotics for livestock breeding; exchange of results. | 10/75 |
| E. I. DuPont de Nemours (US) | SCST* | Research, production and application of agricultural chemicals. | 8/77 |
| Agricultural Equipment | | | |
| Robert Bosch (Germany) | SCST | Outfitting vehicles incl. tractors and agricultural machines, hydraulics and pneumatics, TV technology. | 12/73 |
| Vernigde Machinefabrieken | SCST | Production of turbine blades, rotary screen printing machines, milk | 12/73 |